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GP/I-64

SUMMARY REPORT ON OPERATION [redacted] 50X1

(D/GP No. 142)

1. Photographic recording of an instrument panel is believed to be a luxury item, and therefore could be dispensed with if another means of recording could be incorporated more simply.

The items which should be recorded would be temperature, barometric altitude, and time. These would be used in determining corrected flying altitudes, to give scale of photography. Even these would be unnecessary if objects of measurable dimensions (such as aircraft) were imaged in the photography.

Should it be decided to include the altimeter and thermometer, a simple system of manual recording could be employed to eliminate the weight and complexity of robot photographic recording. The temperature could be recorded at about 15 minute intervals and the pressure at about 5 minute intervals. This would be equal to or better than the type of altitude indications ordinarily received in photography for P.I. purposes.

2. The knowledge of the anticipated range of temperatures of the air space to be traveled are necessary otherwise only to determine if the camera should be heated and insulated, and to determine approximately the dexterity available for camera manipulation.

3. In the P.I. Report GP/I-30 of 20 September 1954, it is suggested that the K-20 camera be used. If the camera is mounted vertically in the floor of the gondola, using the standard 6 3/8" lens, and considering the

minimum altitude of 10,000', the angular coverage being about 43° across the 5" axis of the format, only about 1½ miles of the desired 8-mile width of coverage will be obtainable.

Assuming the maximum altitude of 20,000, under the same conditions as above, the camera will cover a strip only about 3 miles wide.

The coverage width of the K-20 would be correspondingly reduced if the focal length of the camera is increased.

A partial solution to the problem would be two K-20 cameras mounted in a specially constructed bracket to give "split-vertical" coverages, and therefore increase to about 6 miles the width of coverage, still however, at the maximum altitude. At 10,000' the coverage, even with the "split vertical" mount employing 2 cameras would be only about 3 miles.

The tilts imposed upon the K-20's in a split-vertical mount would be about 17°, allowing a 10% overlap, but this should not unduly hamper the photo interpretation. Balloon oscillations will also contribute additional camera tilts.

4. Instead of obtaining a new set of equipment specifications in order to fill the 8 mile area width coverage, it is suggested by this office that a critical re-appraisal of the 8-mile coverage requirement be made. It is believed that this must be an arbitrary figure, since no known airfields have integral P.O.L. sites up to 4 miles away. Any lowering of this requirement will mean a proportional easing of the problem of fitting the camera requirement. Also, a figure should be furnished regarding possible deviation from the intended flight path over the target.

5. A view-finder arrangement with 60% lines in the floor of the gondola would serve as an asset to the photographer in making his exposures and assuring stereo-coverage. Since the speed of the balloon is probably variable and no power supply will be available, the use of an intervalometer is ruled out.

6. In addition to the above mentioned requirement considerations, it is suggested that the idea of utilizing a fixed-camera mount be re-examined. Since the target is an airfield and adjacent P.O.L. sites, its maximum area will probably be in the neighborhood of about 4 miles square. At vehicle speeds estimated to be from 25 to 50 MPH, the time required to traverse the area will be between 5 and 10 minutes. With a single K-20 camera, a minimum of 55 photos will be required to give complete stereo-coverage of a 4 mile square area. This means making an exposure approximately every 5 seconds at the minimum altitude and maximum speed.

7. Recent investigation by D/GP has located a relatively new, hand-held, wide-angle camera which could possibly be used for aerial work. The camera is the Swedish Hasselblad Superwide. Its advantages are wide-angle coverage (90°) which reduces considerably the number of photographs to cover a given area, its light weight, fast lens, and apparent ease of operation. Disadvantages include a 12-exposure roll of film, and the resultant small scale of photography. Presumably, the limitation imposed by the 12-exposure roll could be overcome by having on hand enough loaded backs to give adequate number of exposures to cover

the area. Resolution, which should be enhanced considerably by the lack vehicle vibration, will have to be of such quality to permit enlargement of the photography from about 4 to 8 times and retain interpretability. The size of the format, $2\frac{1}{4}$ x $2\frac{1}{4}$", lends itself to more versatile use than previously considered hand-held cameras of the 35mm variety.

To cover a 4 x 4 mile area, at minimum altitude of 10,000', a minimum of approximately 20 photographs taken with this camera will be required to give complete stereo-coverage. This will allow, at maximum speed, about 15 seconds time per exposure.

In the event that the Hasselblad Superwide camera should prove to provide a resolution which will permit enlargements to suitable interpretation scales (about 1:20,000), it is recommended that in addition to this camera, another of the same make, but equipped with a longer lens be used to supply photography of any "targets of opportunity" which might present themselves and possibly require more detailed interpretation. For this is suggested the Hasselblad 1000F equipped with either the 135 mm Kodak Ektar f/3.5 lens or the 250 mm Zjess-Opton Sonnar f/4 lens. It is realized that some modifications of these cameras might be necessary so that they can be manipulated conveniently under extremely cold conditions.